Joint Accuracy Assessment of Aerosol Retrievals from Multiple Satellite Sensors and GEOS-5 model

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MAPSS: Multi-sensor Aerosol Products Sampling System

- MAPSS uniformly samples Level-2 aerosol products from multiple sensors over uniform areas of 55km centered around sun photometer AERONET ground stations and MAN cruise locations.

- MAPSS supports Level 2 aerosol data from different spaceborne sensors and a model, including MODIS, MISR, OMI, POLDER, CALIOP, SeaWiFS, VIIRS, MERRAero.
AOD error based on AERONET
AOD error
(outliers removed)
AOD error depending on loading
Latitudinal dependence of AOD error based on MAN
Challenges of the multivariate analysis

• Near impossible to report results at each individual site
• Additional parameters further complicate the analysis
  – Multiple statistics (R2, RMSE, Error Envelope, etc.)
  – Multiple seasons
  – Multiple validation strategies (mean vs closest pixel)
  – Different QA filters, outliers, and so on
• Looking at your own data becomes problematic!
• Possible solutions
  – Tables can fit more data than plots, but are harder to read and understand (besides, they can not fit everything either)
  – Digital supplements and archives are a tempting solution, but are they actually read?
  – Interactive tools and data services
Interactive multi-sensor tools

MAPSS data explorer:
http://giovanni.gsfc.nasa.gov/mapss_explorer/

MAPSS in Giovanni:
http://giovanni.gsfc.nasa.gov/mapss/

AERONET data synergy tool:
http://aeronet.gsfc.nasa.gov/cgi-bin/bamgomas_interactive
Benefits of multi-sensor systems for end users of the data

• Dramatically cut learning curve necessary to access multiple data products, including proprietary data formats, proper use of QA flags, usage recommendation, and so on
• Enable quick and efficient what-if analysis
• Reduce overall analysis time

Pitfalls

• Greater potential for abusing the data
• Analysis types are limited to those implemented in the system
  • Need to provide a unified L2(G) data for multiple sensors